REBUTTAL TESTIMONY OF SCOTT PARK
DIRECTOR IRP & ANALYTICS - MIDWEST
DUKE ENERGY BUSINESS SERVICES LLC
ON BEHALF OF DUKE ENERGY INDIANA, LLC
CAUSE NO. 45253
BEFORE THE INDIANA UTILITY REGULATORY COMMISSION

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Scott Park, and my business address is 526 Church Street, Charlotte, North Carolina.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed as Director, IRP & Analytics – Midwest by Duke Energy Business Services LLC, a service company subsidiary of Duke Energy Corporation ("Duke Energy") and a non-utility affiliate of Duke Energy Indiana, LLC ("Duke Energy Indiana" or "Company").

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I received a Bachelor of Arts degree in Economics from Brigham Young University in December of 1992. In May 1997, I received a Master of Business Administration degree from Carnegie Mellon University with a specialization in Finance and Marketing.

From June of 1997 to July of 1999, I was employed by Southern Company Energy Marketing in Atlanta, Georgia. While there, I worked on a joint venture

with Vastar Resources and structured wholesale transactions in the western United States.

From July of 1999 to September of 2001, I was employed by Pacific Gas & Electric in Bethesda, Maryland. While there, I structured wholesale transactions in the western United States.

In September of 2001, I joined Progress Energy in Raleigh, North Carolina, structuring wholesale transactions in the Carolinas and Florida. In 2009, I began a three-year project managing the group that administered Progress Energy's Department of Energy Smart Grid Grant. For most of 2012, I worked in the Fuels Department evaluating various fuel strategies and transactions. Starting in late 2012, I have been in the Duke Energy Integrated Resource Planning and Analytics Department and assumed my current position in May of 2013.

Q. WHAT ARE YOUR RESPONSIBILITIES AS DIRECTOR, IRP & ANALYTICS – MIDWEST?

A. My primary responsibility is to direct the development of the Integrated Resource Plans ("IRPs") for Duke Energy's three Midwestern utilities. And in doing so, this results in the development of a preferred portfolio that can serve customers' future electricity needs. It is important to note that this is not a set of decisions but rather a view of the future at a point in time. Part of the overall planning process is to periodically re-assess plans for changes in underlying assumptions and when it comes time to make a decision, a new analytical effort is undertaken

with then current information. The result of this analysis then makes its way to the appropriate level of management for decision making.

Q. WHAT WAS YOUR ROLE IN DUKE ENERGY INDIANA'S 2018 IRP?

A. My role was to direct the development of the 2018 IRP document. This included the development of the scenarios and sensitivities that were presented in the IRP. Specifically, my team worked with the IRP modeling team and the Energy Efficiency Analytics, Engineering, Forecasting, and Fuels groups.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to respond to testimony of Joint Intervenor[1] witness Ms. Sommer and her "Report on Duke Energy Indiana 2018 IRP".

II. RESPONSE TO THE REPORT

Q. WHAT IS YOUR OVERALL REPSONSE TO MS. SOMMER'S REPORT?

A. Similar to the stakeholder meetings, this report looks to advance Joint Intervenors' own agenda rather than what is best for customers and does so by making immaterial, unsubstantiated, and incorrect claims. In my testimony, I will highlight areas where the report mischaracterizes, is misleading, and contradicts itself.

Q. TO WHAT EXTENT DID THE CAC PARTICIPATE IN THE IRP STAKEHOLDER PROCESS?

[1] The Citizens Action Coalition of Indiana, Inc. ("CAC"), Environmental Working Group, and Indiana Community Action Agency.

A. The CAC and its consultants, including Ms. Sommer, participated in all six of the stakeholder meetings as well as on numerous conference calls.

Q. HOW WOULD YOU LIKE TO RESPOND TO MS. SOMMER'S REPORT?

A. The report makes several claims in the overview section and more in the body of the document. I'll address, point by point, each of these items.

Q. IN THE OVERVIEW OF MS. SOMMER'S REPORT, CERTAIN CLAIMS ARE MADE ABOUT MODELING MONTHLY RESERVE MARGINS. PLEASE RESPOND.

A. Ms. Sommer's report argues that having a monthly reserve margin is not realistic and confuses the short-term resource adequacy view of MISO with the long-term resource adequacy that needs to be considered in the IRP. Under most situations, the reserve margin percentage is at its lowest at the time of the load peaking. In other months, having a monthly reserve margin minimum is a non-binding constraint. For example, if the utility's reserve margin is 15% in the summer, it might be 30% in the spring time and as a result is not a constraint for the optimization.[2]

The report goes on to discuss the situation where enough solar has been added and dispatchable generation retired that the reserve margin is at its lowest

[2] Although load is typically lower in the shoulder months of the year, online generating capacity is also lower due to planned maintenance outages. So, the reserve margin is a consideration in every month of the year.

on a high load morning in the winter. Again, the report is selective in what situations it chooses to make its argument. It says that serving a winter peak should not be an important consideration of the IRP and that the utility can rely on MISO to serve that peak.[3] What the report fails to consider is that if the economics of the industry drive more coal retirements and solar additions, the rest of MISO will also become winter peaking for planning purposes which means that the winter peak now becomes the primary reserve margin constraint. An overall philosophy of the IRP is that the utility will plan for meeting its own resource adequacy and take advantage of MISO purchase and sales to reduce costs.

Q. IN THE OVERVIEW OF MS. SOMMER'S REPORT, CERTAIN CLAIMS ARE MADE ABOUT SELF SUPPLYING CAPACITY. PLEASE RESPOND.

A. The report goes on to confuse reserve margins and its relation to market purchases. As addressed in the previous question, the Company's resource planning strategy is that the utility will plan for meeting its own resource adequacy and take advantage of MISO purchases and sales to reduce costs. The level of market purchases is a function of the production cost of the generating fleet and the price of power in the MISO market. The current market price is

[3] I would note that the Company's highest four peak months used in determining coincident peak included a winter month (August 2017, September 2017, January 2018, and June 2018). See direct testimony of Ms. Maria Diaz, p. 27, line 12-13.

relatively low due to the low price of natural gas and as a result the power market benefits from low cost fuel. As a result, and appropriately, the utility is taking advantage of low market prices to turn off generation and buy more market power. Conversely, if power prices were high, the level of market purchases would drop considerably as more power from the fleet is generated. Meanwhile the generation capacity picture for the utility does and should remain the same.

Q. IN THE OVERVIEW OF MS. SOMMER'S REPORT, CERTAIN CLAIMS ARE MADE ABOUT MARKET PURCHASES. PLEASE RESPOND.

A. Yet again, the report is selective in the data it points to and the claims it makes. The report is critical of the high level of purchases, but ignores data when it doesn't support its claim. Specifically, the "high level" of purchases is only true for some scenarios in certain years. The preferred portfolio has relatively low market purchases over the next 10 years and in some years, this portfolio has net sales. The level of market purchases is strongly tied to the scenario's assumed power price and the presence of carbon regulation. The preferred portfolio increases renewable generation, increasing diversity all while providing resource adequacy. Under some circumstances, the portfolio is able to take advantage of low cost market purchases. Under other circumstances, when the market is not as low, the portfolio can adjust and generate more power.

The report also tries to make a point that the $2/MWh adder that was applied to market purchases in the Company's IRP is addressing a symptom of too many power purchases. Rather, the adder is merely a model adjustment that is

made to better calibrate the model's behavior with that of the real world. The $2/MWhr adder attempts to replicate the real world issues associated with dispatching generating stations. That is, it does not make sense to shut down a generating unit and make purchases from the market the minute there is a one cent difference in costs. This adjustment replicated the real world better by recognizing real world limits.[4] Model calibration is an important part of the modeling process and certainly can be considered a best practice.

Q. IN THE OVERVIEW OF MS. SOMMER'S REPORT, CERTAIN CLAIMS ARE MADE ABOUT UNIT RETIREMENTS. PLEASE RESPOND.

A. Yet again, the report draws incorrect conclusions based on faulty reasoning and blatant omissions. First, the report uses historical data to address unit retirements where retirement analysis should be based on prospective data.

Additionally, the report's analysis uses a monthly average price which completely ignores the dispatchability of the units. Dispatchable units will operate when economic and those periods will have higher average prices than the average of all hours. The report only values the capacity that these units provide at the MISO auction clearing price – a short term market price. The auction clearing price is typically very erratic and tends to be quite low and does not reflect the true value of capacity in the market and is not close to the value for capacity in the bilateral market. The report's approach is overly simplistic and

[4] See rebuttal testimony of Mr. John Swez for more descriptions of real world generation dispatch considerations.

not how the resource planning optimization models solve. In addition to the two previously mentioned errors (using the average monthly MISO price for energy and MISO auction results), the report is also missing the cost of the other generation that would be required to maintain resource adequacy. A key tenet of resource planning is to ensure reliability while minimizing costs and risks which the CAC report does not address.

Q. IN THE OVERVIEW OF MS. SOMMER'S REPORT, CERTAIN CLAIMS ARE MADE ABOUT THE COST OF SOLAR, WIND AND COMBINED CYCLE UNITS. PLEASE RESPOND.

A. Here again, the report selectively cites data that supports its claims. Duke Energy, as part of its normal, enterprise wide business practices, engages two industry leading consulting firms to provide cost data. Renewable data is provided by Navigant and traditional resources cost data is provided by Burns & McDonnell.

Furthermore, the IRP included a low cost solar sensitivity that featured a solar cost that was approximately 35% lower than the base forecast in 2019. The important lesson from this analysis is the impact on the resource plan when the model is presented with significantly lower solar costs. This sensitivity was performed in two scenarios (Reference & Reference w/o Carbon Tax). In the Reference scenario, solar additions accelerated 6 years and a coal retirement retired 4 years earlier. However, in the scenario without a carbon tax, solar investment increases only slightly toward the back of the planning period and the solar investment accelerates 3 years. The lesson here is that in an environment of

low gas prices and no carbon regulation, solar does not become economic until the early to mid-20's.

Q. IN YOUR OPINION, PLEASE DESCRIBE THE PROS AND CONS OF OBTAINING COST INFORMATION THROUGH A RFP PROCESS AND ITS RELEVANCE TO THE 2018 IRP?

A. The Company maintains that the cost information that it receives from the respective consultants who survey the market for quality unit cost information results in the best and least biased data set. When an RFP is issued, bidders will bid a price that maximizes their likelihood of profit. In order to do that, bidders have been known to put in a low bid for an undefined project in order to advance to the short list or win the bid outright. Once that objective has been achieved, the bidder is in a position where it can then negotiate on terms and costs that benefit them. The bid price in a RFP and the final cost is not guaranteed to be the same number, and in fact often differs.

When the Company's consultants survey they market, they are looking for transactable prices across a range of projects. This results in a more robust and unbiased estimate of costs.

As to the relevance of the cost data, it is important to put this aspect of the IRP in perspective. The 2018 IRP was developed based on the cost data that the Company procures from industry leading sources, and, using all of the prevailing data at the time of the IRP analysis, no large scale generation projects were

envisioned in the near term. Once a new generation project is needed, part of that process will include competitive bidding which will be used in the CPCN process.

Q. IN THE OVERVIEW OF MS. SOMMER'S REPORT, CERTAIN CLAIMS ARE MADE ABOUT THE $5/MWH ADDER FOR NEW SOLAR RESOURCES. PLEASE RESPOND.

A. This adder was included to account for the fact that as solar penetration increases, there are greater demands and investments needed on the transmission and distribution ("T&D") system. The report takes issue with a model enhancement that was adopted and based on an actual industry study.[5] The report also fails to realize that just because there might be little solar in the MISO footprint right now, that will not always be the case and the IRP model is a long-term model intended to look 20 years in the future. It is well understood, that as solar penetration increases, there are additional demands placed on the transmission and distribution system to accommodate the additional intermittency. It should also be pointed out that the adder does not become impactful until the late 2020s, when solar penetration is expected to be higher. As further studies are performed, the IRP analysis will adopt newer information and the $5/MWh adder can be adjusted upward or downward as supported by future analysis.[6]

[5] I would note that the report makes claims "without knowing anything about the merits of the Astrape study…" a statement that seems to invalidate their criticism of the report and its usage.

[6] Ms. Sommer's testimony and report also makes much of the fact that the North Carolina Utilities Commission ("NCUC") has recently discussed the use of the Astrape report and such an adder in an attempt to disparage it. But, Ms. Sommer fails to acknowledge that the NCUC also found that the determinations reached in the Astrape Study to use a per MWh adder were found to be reasonable. *In the*

Q. IN THE OVERVIEW OF MS. SOMMER'S REPORT, CERTAIN CLAIMS ARE MADE ABOUT ACCESS TO MODEL MANUALS. PLEASE RESPOND

A. The Company rightfully objected to providing the manuals since they contain copyrighted information belonging to third parties. The Company then offered to make these manuals available at the utility's office. To my knowledge, neither the CAC nor any other party requested the Company to revise its response related to the manuals. To bring the issue up for the first time in their prefiled testimony is disingenuous.

Q. IN THE OVERVIEW OF MS. SOMMER'S REPORT, CERTAIN CLAIMS ARE MADE ABOUT THE PRE-IRP STAKEHOLDER PROCESS. PLEASE RESPOND.

A. The report states that stakeholders provided numerous suggestions on modeling improvements that Duke Energy Indiana did not agree with or said we would consider in the next IRP. While this is true, the CAC is making a leap that is not consistent with the rules for the public advisory process. 170 IAC 160 4-7-2.6(c) states that "the utility should solicit, consider and timely respond to relevant input relating to development of the IRP" and 170 IAC 160 4-7-2.6(d) states that "the utility retains sole responsibility for the content of its IRP." The Company considered and responded to each of the suggestions mentioned in the report and

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Matter of Biennial Determination of Avoided Cost Rates for Electric Utility Purchases from Qualifying Facilities – 2018 (NCUC; Oct. 17, 2019; finding (4)).

explained why the suggestion wasn't being adopted. For example, the CAC frequently suggests using "the decrement approach" for modeling energy efficiency after the utilities adopting the CAC's supply side approach didn't give them the answers they wanted. The decrement approach has a fatal flaw in that one must make a specific assumption about the decrement energy to come up with a dollar savings amount with the problem being that each energy efficiency measure has its own load savings shape. So, if 0.25% of load is removed from the load forecast and that creates a savings of $X, it then must follow that energy efficiency measures would need to be selected to fit this arbitrary shape. Savings shapes and cost savings are inextricably linked which makes having arbitrary energy savings as the foundation of the energy efficiency analysis unreasonable. The report seems to complain that the Company disagreed with its suggestions. However, that is, of course, the Company's right to do. It is the Company's IRP and the Company's responsibility to reliably serve its customers.

Q. ARE THERE OTHER PARTS OF THE REPORT THAT YOU WOULD LIKE TO ADDRESS?

A. Yes, these responses will address the additional issues raised in the body of the document.

Q. HOW DO YOU RESPOND TO THE TABLES IN THE REPORT THAT LIST VARIOUS IRP RULES AND ASSIGN UNSUPPORTED FINDINGS OF "MET, NOT MET, PARTIAL"?

A. The report includes several tables where various requirements of the IRP rules are cited and then the report makes an unsubstantiated and unexplained finding on whether the requirement was met without any support. For example, in Table 1, the report "finds" that the Company *partially* complied with the following: "The IRP process should be developed and carried out to include stakeholder participation". This is patently untrue as six, day-long stakeholder meetings were held in addition to numerous conference calls and discovery responses. While I will not address each and every criticism the report piles on the Company's 2018 IRP in this testimony, failure to address each does not indicate any sort of agreement with the report's "conclusions" no matter how cursory.

Q. HOW DO YOU RESPOND TO THE REPORT'S CRITICISM THAT THE IRP MODELING SHOULD BE ON AN UCAP VS ICAP BASIS?

A. The CAC has frequently mentioned that the IRP should be modeled on an UCAP basis where the output of a generating unit is adjusted for historical outages which is how MISO measures capacity for the one-year capacity auctions. MISO determines a UCAP reserve margin that ensures resource adequacy and typically this number is in the 7-8% range as it changes every year. To apply this methodology, the utility would not only need to estimate how the UCAP reserve margin requirement will change over time, it must also estimate future unplanned outages at each of the generating units. These difficulties with modeling and estimating are never addressed by Ms. Sommer's report.

Duke Energy Indiana has continued to model the IRP on an ICAP basis where generators are given their nameplate capacity. Resource adequacy is then assured by planning to a higher 15% level. Conceptually, ICAP and UCAP are measuring the same thing. One can reduce reserve margin and increase unplanned unit outages based on difficult assumptions or one can model a higher reserve margin (again to reflect such unplanned unit outages) which has been successful for many decades. The reserve margin used by Duke Energy Indiana is also well within the range of reserve margins of other utilities across the nation. Estimating additional variables with no apparent benefit is not a good planning practice.

Q. HOW DO YOU RESPOND TO THE REPORT'S CRITICISM OF THE WAY ENERGY EFFICIENCY ("EE") WAS MODELED IN THE IRP?

A. The report makes a number of criticisms of the way the Company's IRP models Energy Efficiency despite the utility going to considerable effort in modeling EE as supply side resources, which was initially requested by the CAC.

1) The report makes an erroneous comparison between historical costs of EE to future costs of EE.

2) The report also makes much of the Company's half year convention, coming to an incorrect conclusion. The Company's IRP assumes that EE adoption happens ratably over the course of the year. Assuming the entire EE savings capabilities are in place at the beginning of the year is not correct or realistic.

3) The report goes on to claim that EE savings should be grossed up at marginal losses rather than at the average losses. Losses are location specific and a function of line loading with higher losses occurring during periods of high load. Because the IRP does not have locational information on where customers will choose to adopt EE programs and the EE savings are being spread across all hours, assuming average losses is more appropriate than assuming marginal losses.

I will address each of these points in more detail beginning with EE costs.

Q. PLEASE RESPOND TO THE REPORT'S CRITICISM OF THE ENERGY EFFICENCY COSTS USED.

A. The Company agrees that the levelized costs for the EE bundles which start in 2021 and beyond are higher than those experienced to date. However, the program costs were directly provided by an independent third-party (Nexant) in the Market Potential Study and the Company was fully transparent and forthcoming with the use of those costs in its IRP. The Company should not be subject to criticism by using the very outputs of a third-party study that the parties agreed should be conducted and used in the IRP and energy efficiency planning process.

Further, the report attempts to show that IRP bundle levelized costs are significantly higher than historical levelized program costs. However, the methodology described in the report to calculate the Levelized Program Costs for these historical bundles is incorrect and does not make for a valid comparison.

When calculated properly, the most recent actual levelized costs are very close to those used in the IRP.

Specifically, Ms. Sommer's report continued to use a flawed methodology despite the Company explaining that the use of a single and static portfolio-level measure life is not accurate or appropriate. As the composition of the selected EE bundles change over time, so does the weighted average measure life which one must use to make correct levelized costs. The calculation that Ms. Sommer uses appears to assume a constant measure life of 10 years regardless of composition of the selected EE bundles.

Furthermore, the CAC has stated "Duke's portfolio levelized costs have ranged from $.015 to $.029 per MWh from 2012 to 2019." However, in the table provided by Ms. Sommer in this proceeding, the highest value shown is $0.21/KWh, demonstrating inconsistency.

Done correctly, the calculation clearly shows that the levelized program costs have steadily increased over the last several years with the exception of 2018 which showed a slight decrease. For 2018, the most recent year for which actual costs are available, using the assumptions used by the CAC for discount rate and program costs in 2018 dollars, the correct levelized costs are approximately $0.031 per first year KWh. This value is much higher than the value incorrectly calculated by the CAC of $0.018.

The Company has prepared a detailed spreadsheet analysis, included as my Rebuttal Workpaper 1-SP, which shows the correct way to calculate the

historical levelized costs for the actual program results for 2012-18. This workpaper uses information derived from prior annual Duke Energy Indiana energy efficiency filings as well as from Data Request responses provided to the CAC in the rate case and the 2018 IRP. In addition, this analysis uses the fundamental assumptions provided by Ms. Sommer in her description of her calculations, *i.e.,* that she used the real discount rate and all of the results are shown in 2018 dollars. Ms. Sommer did not provide her assumed inflation rate but for the purpose of the Company's analysis an inflation rate of 2% per year was assumed. The spreadsheet is designed to allow for certain key variables to be modified including the use of the Company's WACC in lieu of the real discount rate and allowing the assumed inflation rate to be modified.

For the sake of comparison, the Company has included Table 1 below showing the values calculated incorrectly by Ms. Sommer's report next to the correct values. Table 1 also includes a calculation made by the Company where, instead of using the correct methodology which accounts for the measure lives by programs, the calculation is performed by calculating the levelized costs using the total portfolio costs, the total first year KWh savings and an assumption of a single portfolio-level measure life of 10 years. This is the methodology that was supposedly used by the CAC; however, the results presented below in the fourth column show some significant differences between the Duke Energy Indiana calculated values versus those provided by Ms. Sommer's report in the second

column. This calls into question whether the report, in fact, used the methodology that they describe in their testimony.

Table 1

Historical Levelized Cost Comparison
Levelized $/First Year KWh, Gross at Plant

Year	Joint Intervenors Filed Calulation	Duke Energy Indiana Calculation	Duke Energy Indiana Calculation using Joint Intervenors Assumptions
2012	$0.015	$0.014	$0.014
2013	$0.020	$0.023	$0.019
2014	$0.019	$0.023	$0.018
2015	$0.019	$0.028	$0.016
2016	$0.021	$0.025	$0.017
2017	$0.017	$0.038	$0.027
2018	$0.018	$0.031	$0.020

1. Assume Duke Real Discount rate used in IRP of 4.59%
2. Assume all Program Costs in 2018 $ using 2% Inflation

In summary, the Company agrees that the levelized costs for the bundles beginning in 2021 are in some cases higher than the historical levelized costs. However, the costs are not as divergent from the historic levels when they are compared to the proper calculations of levelized costs using the program (or bundle) specific measure life.

Q. PLEASE RESPOND TO THE REPORT'S CRITICISM OF THE COMPANY'S USE OF "HALF YEAR" CONVENTION.

A. The report's contention that the Company is incorrectly treating the cumulative effect of EE measures being adopted over time by use of the half-year convention is false.

As the Company has repeatedly attempted to explain to the CAC in this IRP analysis and others, in order for the IRP process to correctly evaluate the impact on the system peak load, the impact associated with the adoption of EE measures cannot all be assumed to have been added on January 1 of a given year. To do so would significantly over estimate the amount of savings available from EE measures at the time of the summer peak (assumed to occur in July). In fact, assuming an even distribution of customer adoption throughout the year would estimate that roughly half of the EE savings would be occurring at the time of the system summer peak.

The method employed by the Company is the same method that has been used in all past IRP proceedings and it has not been questioned by the Commission in the past. The report contends that by using this method, the Company is somehow ignoring the impacts for half of a given year. To quote Ms. Sommer, "*What is missing from this explanation is that the "half" a year's worth of savings from the prior year also should be reflected in the total savings*".

The report would have the reader believe that the Company has chosen to ignore some of the savings from a given bundle, but that statement is false and misleading.

What the report fails to understand is that all of the savings from each bundle are correctly accounted for because each bundle is being treated as a discrete amount of cumulative savings, but the cumulative savings from all selected bundles are added together in the final analysis used in the IRP.

In the report's example, it contends that the "leftover" savings from the second half of the final year from a given bundle should be added to the beginning year of the next sequential bundle. However, the report fails to understand that those "leftover" savings are already being included in the next year of the ongoing savings from *the original bundle* and therefore would be double counted if also included in the first year of the subsequent bundle.

As an example, assume that the final year (2023) of a given bundle of savings for the period 2021-23 was expected to achieve 10,000 MWh. Using the correct methodology of spreading those savings throughout the year 2023, the entire 2021-23 bundle would be presented to the IRP model with roughly half of those 10,000 MWh having occurred during 2023 and the remaining MWh occurring in 2024 and continuing to contribute savings in that original bundle throughout the remainder of the measure life of that bundle. Said another way, if that bundle was selected by the IRP model, then those "leftover" savings would be included in the lifetime cumulative savings for that bundle in 2024 and the inclusion of that 2021-23 bundle would correctly show those savings in the IRP model.

If, as the report suggests, these "leftover" savings from 2023 were also included in the first year of the next sequential bundle (2024-27 for example) then those same savings would be included in the IRP twice, once in the 2024 portion of the original 2021-23 bundle and again in the 2024 portion of the 2024-27 bundle.

Table 2 below shows an example of how the methodology proposed by the report results in double counting of these cumulative savings.

Table 2

Example of Current Duke Methodolgy compared to Proposed Joint Intervenors Methodology

			2021	2022	2023	2024	2025	2026	2027
Assumed Bundles	2021-23	Incremental Annual	10,000	10,000	10,000				
	2024-26	Incremental Annual				10,000	10,000	10,000	
		Total Incremental	10,000	10,000	10,000	10,000	10,000	10,000	
		Total Cumulative	**10,000**	**20,000**	**30,000**	**40,000**	**50,000**	**60,000**	**60,000**
Current Duke Enegy Indiana	2021-23	Half Year Incremental	5,000	10,000	10,000	5,000	-	-	-
	2024-26	Half Year Incremental				5,000	10,000	10,000	5,000
		Total Incremental	5,000	10,000	10,000	10,000	10,000	10,000	5,000
		Total Cumulative	**5,000**	**15,000**	**25,000**	**35,000**	**45,000**	**55,000**	**60,000**
Proposed Joint Intervenors	2021-23	Half Year Incremental	5,000	10,000	10,000	5,000	-	-	-
	"Leftover"	Proposed by Joint Intervenors				5,000			
	2024-26	Half Year Incremental				5,000	10,000	10,000	5,000
		Total Incremental	5,000	10,000	10,000	15,000	10,000	10,000	5,000
		Total Cumulative	**5,000**	**15,000**	**25,000**	**40,000**	**50,000**	**60,000**	**65,000**
		Cumulative Difference	-	-	-	**5,000**	**5,000**	**5,000**	**5,000**

Q. HOW DO YOU RESPOND TO THE REPORT'S CRITICISM OF THE LOAD FORECASTS USED IN THE IRP?

A. The report spends several pages discussing the load forecast with most of its focus on how the forecasted growth rate is different from historical levels. The report's analysis suffers from a conveniently selected time period and even then, the difference is not material. The Company uses a longer time period for its data set for forecasting load, but the report conveniently only uses the past 11 years which

have seen not only the Great Recession but also the adoption of very efficient lighting.

Using the limited historical data and ignoring the cyclical and structural changes in energy usage, the report still only shows a difference in the average growth rate of demand of 0.26% and on energy 1.1%. In relation to the Duke Energy Indiana system, this translates to 15 MW in a year on a demand basis and approximately 370 GWh on an energy basis. To put this in context, one only needs to compare these differences with the historical data to see that these differences are within historical variability. As the Company routinely does, the load forecast will be updated every year and, as more information is gathered, the load forecast will be updated.

Q. HOW DO YOU RESPOND TO THE REPORT'S ARGUMENT THAT PAIRED SOLAR WITH STORAGE WAS NOT APPROPRIATELY CONSIDERED IN THE IRP?

A. The report suggests that the IRP is deficient in how it considers paired solar with storage systems. The IRP included this technology as an option and the model was free to select multiple units of the paired resource, but did not due to economics. This is not surprising because if solar is only economic under certain circumstances and storage is economic on only location specific niche applications, pairing the resources is an even less compelling proposition.

LG&E conducted a very interesting study where it studied the amount of solar and storage needed to serve a 9 MW circuit. When served by dispatchable

resources, the capacity need would be approximately 11 MW. The study found that in order to maintain reliability, it would take 75 MW of solar and additional 75 MW of storage. The cost per unit of renewable resources is not a complete metric as a renewable MW is not a one for one substitute for dispatchable generation.

Q. HOW DO YOU RESPOND TO WHAT THE REPORT SAYS ABOUT SELECTION OF THE PREFERRED PORTFOLIO?

A. This is another example of the half-truths that report relies upon. The report claims that that there are four portfolios that are lower cost than the Moderate Transition portfolio that was selected as the preferred portfolio in the IRP. What the report fails to mention is that this only true in some of the scenarios that the IRP considered. For example, the Current Conditions, Slower Innovation and Reference, No Carbon portfolios are all more expensive than the Moderate Transition portfolio in the scenarios that include carbon regulation.

The report then undermines itself by criticizing the preferred portfolio in the next paragraph for not moving fast enough with regard to carbon reduction, but then goes on to criticize the preferred portfolio based on cost in scenarios without a carbon tax. Since greater carbon reductions and costs are positively correlated, it is disingenuous to criticize the preferred portfolio for its carbon reduction in one scenario and its costs in materially different scenarios.

Furthermore, the report accuses the IRP of adopting a "wait and see approach that undermines the objectives of the current IRP and the efforts of its

stakeholders". This is a mischaracterization at best. The preferred portfolio accelerates coal retirements and renewable additions in an unprecedented fashion for the utility despite the current absence of meaningful carbon regulation. If carbon regulation becomes more impactful, it is reasonable to think that the utility's resource plans would respond accordingly. The report makes an untrue assertion and then attempts to add credibility to its claims by attributing it to "stakeholders". While some stakeholders might agree with the Joint Intervenors, in no way can they legitimately speak for all stakeholders.

Q. HOW DOES THE REPORT MAKE USE OF THE TRANSMISSION STUDY INCLUDED IN THE APPENDIX?

A. Yet again, the report attempts to mislead the reader by citing transmission study data that wasn't available at the time of the IRP modeling. A separate transmission study was provided that was concurrent with the IRP analysis and showed significant transmission upgrades (in terms of cost and lead time) associated with unit retirements. As the rebuttal testimony of Mr. Keith Pike explains in more detail, transmission study results are subject to updating and point in time results.

Q. INDUSTRIAL GROUP WITNESS MR. ANDREWS STATES THAT DUKE ENERGY INDIANA ADMITS TO ERRORS IN THE 2018 IRP THAT IT HAS NOT RECTIFIED.[7] HOW SHOULD THE COMMISSION

[7] Andrews Direct testimony, Page 17 Line 14, to Page 18 Line 20.

CONSIDER THE REASONABLENESS OF THE IRP PREFERRED PORTFOLIO IN LIGHT OF THESE ERRORS?

A. While we have regrettably identified some minor errors in the execution of the 2018 IRP, we should acknowledge the reality that no process is perfect. Further, as discussed at a high level by Company witness Mr. Pike in his rebuttal testimony, there is considerable uncertainty in the grand scheme of all assumptions within any IRP. The relative materiality of the identified errors is de minimis compared to the breadth of assumptions defining our five future modeling scenarios, be it fuel prices, energy prices, technology costs, carbon regulatory programs, and more. Taken out of context, implications of the word "error" can easily be blown out of proportion, as Mr. Andrews has attempted to do. However, for numerous reasons as I discuss, our selected preferred portfolio remains robust and reasonable.

Q. INDUSTRIAL GROUP WITNESS MR. ANDREWS FURTHER COMPLAINS THAT DUKE ENERGY INDIANA DID NOT INCLUDE RECOVERY OF EXISTING GENERATION UNIT NET BOOK VALUE IN ITS IRP, AND THAT OMISSION SHOULD REDUCE THE RELIABILITY OF THE COMPANY'S PREFERRED PORTFOLIO.[8] HOW DO YOUR RESPOND?

[8] Andrews Direct testimony, Page 19, Lines 1-14.

A. Exclusion of remaining net book value of existing assets in an IRP is standard practice and does not dissuade from the robustness of the preferred portfolio in any way. While Mr. Andrews is correct that accelerating generating unit retirements increases the present value of revenue requirements ("PVRR") of depreciation, he failed to consider the fact that at the same time, the PVRR of the return components (equity, debt, and tax gross up) are decreasing for every year the rate base is brought forward and reduced. These affects are largely offsetting, so that the total PVRR of existing net book value (of and on) is relatively insensitive to remaining asset life. Therefore, exclusion of it from an IRP has no material impact on portfolio PVRR, nor the selection of the preferred portfolio.

Q. PLEASE DISCUSS THE REASONABLENESS OF THE RETIREMENT SCEHDULE IN THE PREFERRED PORTFOLIO.

A. In recognition to a changing but uncertain future, the measured retirement schedule in the preferred portfolio is very reasonable and makes sense for customers. Furthermore, when measured across five different scenarios on the basis of cost, CO2 emissions and market exposure, the Moderate Transition portfolio was selected as the preferred portfolio. This portfolio is the most aggressive in terms of coal retirements and renewable additions than any previous IRP. The Company is flexible in its planning and responds to a changing world, but does not have the luxury and intends to do so in a thoughtful and programmatic fashion.

I would also like to add that during the stakeholder process, the CAC as well as the other stakeholders were given the opportunity to develop their own portfolios and could accelerate retirements as quickly as they desired as well as add as much renewable generation as they wanted. The CAC chose not to do so and I suspect didn't want to see the results of a such an extreme portfolio. In general, there isn't that much debate on the evolution of the generating fleet, but rather the debate is on the timing. The Company believes that a measure approach makes the most sense for customers.

Q. PLEASE DISCUSS THE IMPACT OF SWAPPING THE RETIRMENT DATES OF THE GIBSON 4 AND GIBSON 5 UNITS.

A. After the IRP had been developed, the Joint Owners of Gibson 5 Unit approached the Company about the possibility of retiring Gibson 5 sooner. Witnesses for the Joint Owners provided testimony in this proceeding that both joint owners were in favor of a 2026 retirement for Gibson Unit 5. The Company looked into the possibility of moving the retirement of Gibson 5 to 2026 and delaying the retirement of Gibson 4 to 2034. This change has minimal impact on the PVRR of the portfolio and results in a slight rate reduction to customers. Offsetting this benefit is that it does slow down carbon reductions of the portfolio as well as renewable additions. There is always the possibility that Duke Energy Indiana could proceed with the original preferred portfolio renewables installation schedule for the energy diversity benefit, even if that would make the portfolio a little long on capacity for several years. As no near-term actions are needed either

way, this can be further re-evaluated in the 2021 IRP cycle. Otherwise, the Gibson Unit 4-5 retirement date swap is mutually beneficial to the Joint Owners and Duke Energy Indiana customers.

III. CONCLUSION

Q. GIVEN ALL THE INTERVENOR TESTIMONY YOU HAVE REVIEWED RELATED TO THE IRP, WHAT ARE YOUR CONCLUSIONS?

A. I conclude that the IRP process and results remain reasonable and most importantly a robust choice given the potential for many different future scenarios. The robustness of the preferred portfolio across a variety of futures factoring in multiple attributes (cost, CO2 reduction and risk) demonstrates its reasonableness.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.

VERIFICATION

I hereby verify under the penalties of perjury that the foregoing representations are true to the best of my knowledge, information and belief.

Signed: _____ Dated: 12-4-2019

Scott Park